Dynamics of Mercury in Eared Grebes on the Great Salt Lake

Presentation to the Mercury Workgroup
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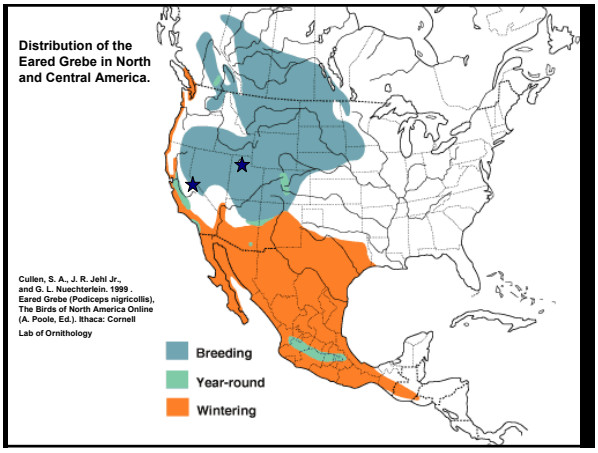
Funded Study FY'06

- U.S. Fish and Wildlife, Ecological Services (UT)
- U.S. Geological Survey, Biological Resources Division, U.C. Davis (CA)
- Dr. Joe R. Jehl, Smithsonian Institute

Partners

- U.S. Geological Survey, WRD (UT) (WI)
- Utah Division of Water Quality
- Utah Division of Wildlife Resources

Eared Grebe (C. Allan Morgan)



Why *Podiceps nigricollis*?

- Eared grebes spend 3 to 4 months on GSL during fall migration (Sept – Dec)
- They eat brine shrimp almost exclusively
- Previous FWS data suggest Hg accumulation
- There is a reference population at Mono Lake in California
- Historic data and archived samples

Study Questions

- Does mercury accumulate in grebes residing on Great Salt Lake?
- If so, is GSL different than other lakes?
- Does molting provide a way for grebes to eliminate excess mercury?
- Have conditions at GSL changed over time?

Additional Considerations

- Are other species that utilize GSL at risk?
- Are there implications for human health?
- What role does molting and feather growth play in other species?
- Where might the GSL be headed?

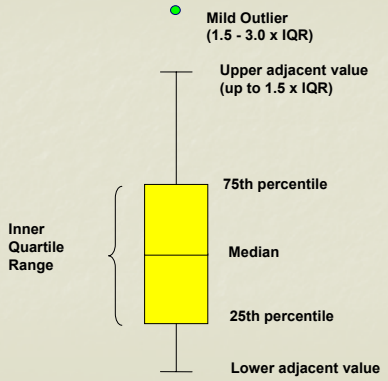
Hypotheses

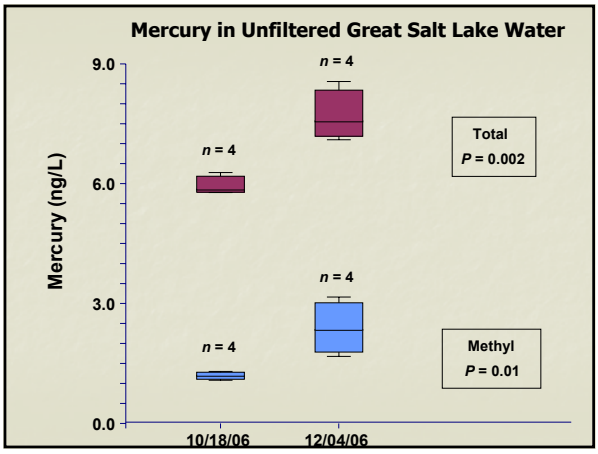
- Do Hg concentrations differ:
  1) Among stage of migration (Oct / Dec)
  2) Among locations (GSL / Mono Lake)
  3) Between years (1992 / 2006)

Collections

- Water (unfiltered, total and methyl)
- Brine Shrimp (total)
- Eared Grebes
  - Livers (total and methyl)
  - Breast Muscle (total and methyl)
  - Breast Feathers (total)
  - Primary Feathers (total)

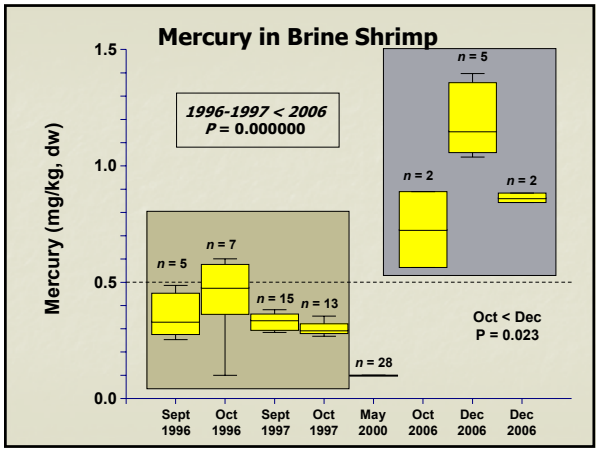
How to Read a Box Plot

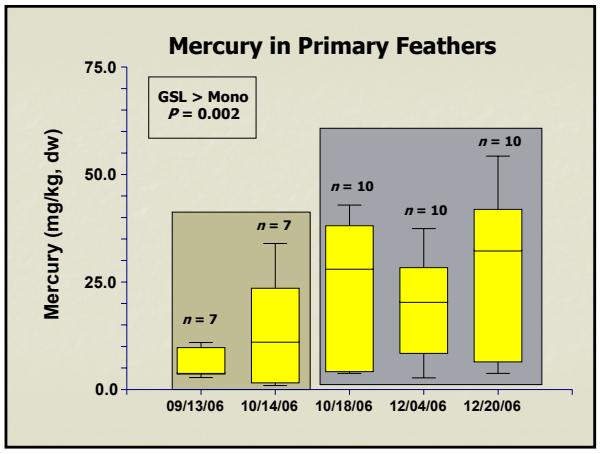


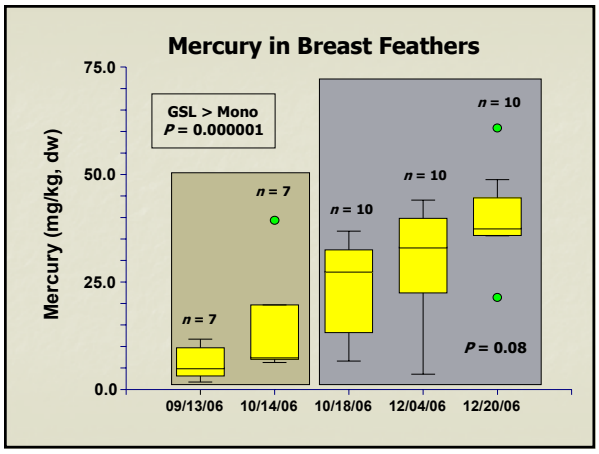


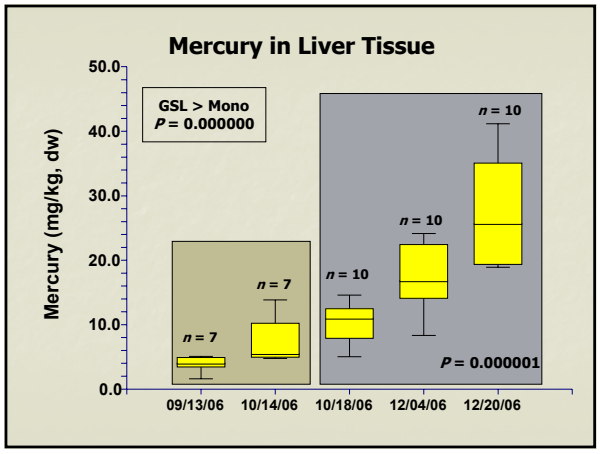
Trolling for brine shrimp.

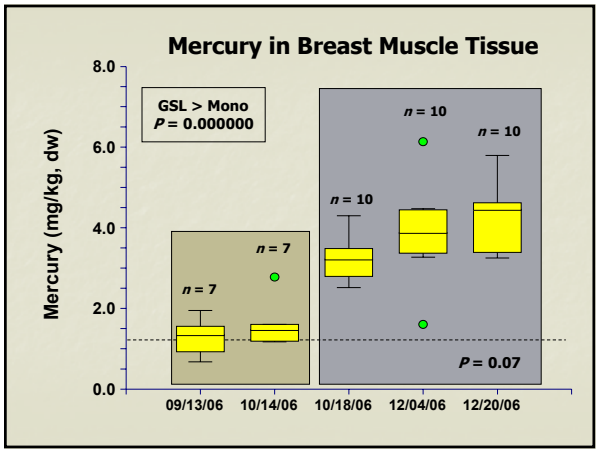
Brine shrimp streak.

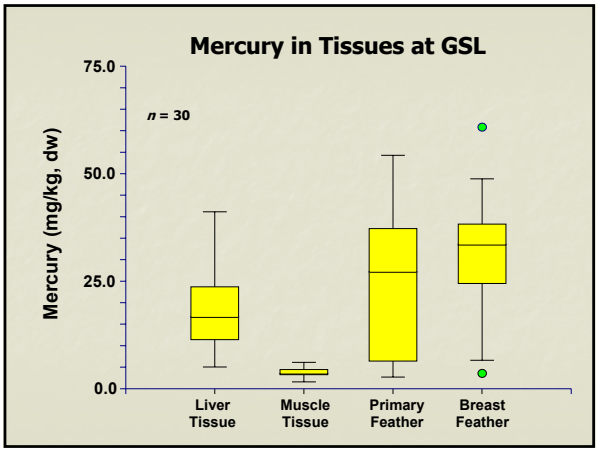


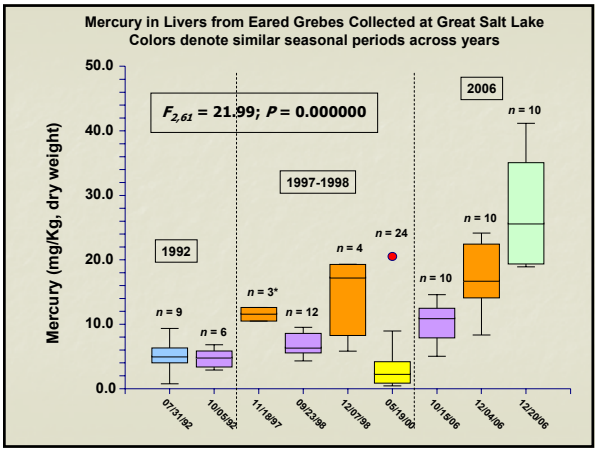


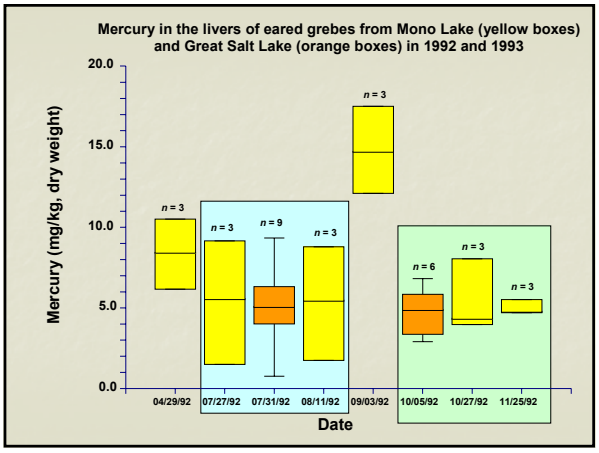












Conclusions

- Mercury increased in livers, breast muscle and breast feathers of birds on GSL but only livers were significant (<0.05)
- Concentrations were significantly higher at GSL compared to Mono Lake for all tissues
- Concentrations in livers were significantly higher in 2006 compared to 1992

Conclusions

- Total and methyl mercury in unfiltered water samples were significantly higher in December samples
- Mercury in brine shrimp was significantly higher in December compared to October
- Concentrations in brine shrimp were three times higher than a decade ago